

नेपाल सरकार  
गृह मन्त्रालय  
नेपाल प्रहरी प्रधान कार्यालय  
(मानवश्रोत विकास विभाग, भर्ना छनौट शाखा)  
नक्साल, काठमाण्डौ ।

**प्राविधिक प्रहरी निरीक्षक (रेडियोग्राफी) पदको खुला प्रतियोगितात्मक  
परीक्षाको पाठ्यक्रम**

सेवा: नेपाल प्रहरी  
उपसमूह: स्वास्थ्य

समूह: प्राविधिक प्रहरी  
श्रेणी: राजपत्राङ्कित तृतीय

**परीक्षा योजना (Examination Scheme)**

क्र.सं.	परीक्षा चरण	विवरण	पूर्णाङ्क
१.	प्रथम चरण	प्रारम्भिक तथा विस्तृत स्वास्थ्य परीक्षण	-
२.	द्वितीय चरण	लिखित परीक्षा	२००
३.	तृतीय चरण	विशेष स्वास्थ्य परीक्षण	-
४.	चतुर्थ चरण	अन्तरवार्ता	३०

**प्रथम चरण:-** प्रारम्भिक तथा विस्तृत स्वास्थ्य परीक्षण

- प्रहरी सेवाको पदमा नियुक्ति र बढुवा गर्दा अपनाउनु पर्ने सामान्य सिद्धान्त, २०६९ को अनुसूची-६ र ८ बमोजिम हुने ।

**द्वितीय चरण:-** लिखित परीक्षा योजना (Written Examination Scheme)

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या अङ्कभार	समय
प्रथम	Professional and Service Specific Test (PSST)	१००	४०	वस्तुगत बहुवैकल्पिक प्रश्न (Multiple Choice)	१०० प्रश्न×१ अंक = १००	१ घण्टा १५ मिनेट
द्वितीय		१००	४०	विषयगत (Subjective)	<u>छोटो उत्तर</u> ४ प्रश्न×५ अंक = २० <u>लामो उत्तर</u> ८ प्रश्न ×१० अंक = ८०	३ घण्टा

**तृतीय चरण:-** विशेष स्वास्थ्य परीक्षण

- प्रहरी सेवाको पदमा नियुक्ति र बढुवा गर्दा अपनाउनु पर्ने सामान्य सिद्धान्त, २०६९ को अनुसूची-९ बमोजिम हुने ।

**चतुर्थ चरण:- अन्तरवार्ता (Interview)**

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तरवार्ता	३०	मौखिक

- यो पाठ्यक्रमको योजना अनुसार दुई पत्रको लिखित परीक्षा हुनेछ ।
- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।
- पाठ्यक्रमको प्रथम र द्वितीय पत्रको विषयवस्तु एउटै हुनेछ ।
- प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
- लिखित परीक्षाको प्रथम तथा द्वितीय पत्रको पाठ्यक्रमका इकाइहरूको प्रश्नहरूको संख्या निम्नानुसार हुनेछ ।

प्रथम पत्रका इकाइ	१	२	३	४	५	६	७	८	९	१०	११	१२	१३	१४	१५	१६	१७	१८
प्रथम पत्रका प्रश्न संख्या	५	५	७	७	७	७	५	३	७	५	९	४	७	५	२	३	२	१०
द्वितीय पत्रका खण्ड	खण्ड-क (A)								खण्ड-ख (B)								खण्ड-ग (C)	
द्वितीय पत्रका इकाइ	१	२	३	४	५	६	७	८	९	१०	११	१२	१३	१४	१५	१६	१७	१८
द्वितीय पत्रका	छोटो	१								१								२
प्रश्न संख्या	लामो	४								४								

- यस पाठ्यक्रममा जे सुकै कुरा लेखिएको भए तापनि पाठ्यक्रममा परेका ऐन नियमहरू तथा नीतिहरू परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा रहेको सम्झनु पर्छ ।
- वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरूको उत्तर सही दिएमा प्रत्येक सही उत्तर बापत १ (एक) अंक दिईने छ भने गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २०% अंक कट्टा गरिने छ । तर उत्तर नदिएमा त्यस बापत अंक दिईने छैन र अंक कट्टा पनि गरिने छैन ।
- द्वितीय पत्रको विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरूको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरू (Short notes) सोध्न सकिनेछ ।
- द्वितीय पत्रको पाठ्यक्रमलाई ३ वटा खण्डमा विभाजन गरिएको छ । ३ वटा खण्डको लागि ३ वटै उत्तरपुस्तिका दिईनेछ र परीक्षार्थीले प्रत्येक खण्डका प्रश्नहरूको उत्तर सोही खण्डको उत्तरपुस्तिकामा लेख्नुपर्नेछ ।
- यस भन्दा अगाडि लागू भएको माथि उल्लेखित समूहको पाठ्यक्रम खारेज गरिएको छ ।

**पाठ्यक्रम लागू मिति:- २०७९/१०/१९ गते ।**

## लिखित परीक्षा (Written Examination)

### प्रथम र द्वितीय पत्र :- Professional and Service Specific Test (PSST)

#### खण्ड “क” (Section-A)

#### 1. Human Anatomy

- 1.1. Introduction of Anatomy of Human Body as whole
- 1.2. Musculo-skeletal system
- 1.3. Nervous System
- 1.4. Cardiovascular System
- 1.5. The Lymphatic System
- 1.6. The Respiratory system
- 1.7. The Digestive System
- 1.8. The Urinary System
- 1.9. The Reproductive System
- 1.10. Special Senses
- 1.11. The Endocrine system
- 1.12. Practical-identification of major bones, muscles, central and peripheral nervous system, organs of respiratory system, heart and vessels, organs of GIT, organs of reproductive and endocrine system, organs of urinary system

#### 2. Human Physiology

- 2.1. General Physiology
- 2.2. Cardiovascular system and Blood, Applied-Shock, CPR, Hypertension, Anemia
- 2.3. Respiratory system, applied-cyanosis, hypoxia, dyspnoea, hyperventilation, respiratory failure, COPD
- 2.4. Digestive System, applied-ulcer, diarrhea, constipation, vomiting, malabsorption syndrome, pancreatitis and jaundice
- 2.5. The Musculoskeletal system, applied-exercise, atrophy, hypertrophy of muscle, fasciculation and fibrillation
- 2.6. The Nervous System/Special senses, applied-paralysis, convulsion, refractive errors, pupillary reaction in life and death, upper and lower motor neuron lesion, Babinski sign and ataxia and tuning fork hearing tests
- 2.7. The Urinary system, applied-renal stones, ureteric stones and bladder stones, renal function, acidosis, alkalosis and renal failure
- 2.8. The endocrine and reproductive System,

#### 3. Basic Radiation Physics

- 3.1. Electricity - Current, Voltage, Faradays' laws, Lenz's laws, mutual induction phenomena
- 3.2. Transformer - Different types of transformers (step down and step-up transformer, central tapped transformer, Auto transformer and variac transformer)
- 3.3. Thermionic Emission, semiconductor and Rectifiers - phenomena of thermionic emission and Richardson, formation of P and N type semiconductor
- 3.4. Atomic Structure and Electromagnetic Radiation - Different electron shell Bohr's theory of hydrogen atom, phenomenon of excitation and ionization and their corresponding potential
- 3.5. Unit V: Measure of Electromagnetic Radiation and other Particles - measurement of radiation and particles
- 3.6. X-Rays - X-ray production (gas filled tube and Coolidge tube) and the properties and uses
- 3.7. Radioactivity - Discovery of Nucleus and its constituents (Proton, Neutron), mass number, atomic mass, atomic mass unit and isotopes.
- 3.8. Interaction of Radiation with Matter - Radiation passes through the body, difference between homogeneous and heterogeneous beam.
- 3.9. Ultrasound - longitudinal wave and high frequency sound wave, generation and reception of ultrasound, intensity, power and field of ultrasound.

#### **4. Radiographic Equipment**

- 4.1. X-ray Tubes - X-ray tube tubes and its development, basic design of stationary and rotating anode x-ray tube.
- 4.2. Radiographic Couches, Stands and Tube Supports - Classify X-ray tube supports, various types of Radiographic couches.
- 4.3. Exposure Timers - Different type of timers (photoelectric timer and ionization chamber timer)
- 4.4. Beam Centering and beam Limiting Devices - Functioning of Coins and cylinders, Aperture diaphragms, Lighting beam diaphragms, positive beam limitation
- 4.5. Portable and Mobile Radiographic Equipments -
- 4.6. Control of Scattered Radiation - Significance of scattered radiation, methods of controlling scattered radiation, and techniques of reducing the amount of scattered radiation produced.
- 4.7. Fluoroscopic Equipment - Conventional fluoroscopy, fluoroscopy screen and fluoroscopic image, features of fluoroscopic X-ray table.
- 4.8. Radiation protection - Radiation sensitivity, factors influencing radio- sensitivity.
- 4.9. Tomography - Principle of Tomography, features of tomography equipment.
- 4.10. Equipment for dental Radiography Unit XII: Mammographic Equipment -Differentiate Mammography x- ray tube and ordinary x-ray tube.
- 4.11. Photofluorography - design photofluorography system (cut film and roll film type)

#### **5. Radiographic photography**

- 5.1. Radiographic Photography Principles - Photographic effect, photosensitive materials, photographic emulsion, gelatin and function of the gelatin binder.
- 5.2. X-ray Films - background of X-ray film and its construction, duplitzed x-ray film.
- 5.3. Image Characteristics - real and mental image, reflected, transmitted and emitted light image.
- 5.4. X-ray Film Processing - development of hand processing to automatic processing, processing cycles, constituent of developing solutions and developer replenisher solution.
- 5.5. Storage & Archiving of Film - Storage areas, storage condition.
- 5.6. Intensifying screens - luminescence, fluorescence and phosphorescence, quantum detection efficiency.
- 5.7. Design and Construction of Darkroom - Layout of a well-equipped ideal darkroom, darkroom location, size, radiation protection, floor.
- 5.8. Presentation and viewing of Radiographs - Types of information: essential, technical and miscellaneous, methods of recording information: opaque letters and legends, actinic marking and perforating device.
- 5.9. Estimation of Exposure Factors - Kilo voltage (kV) and its effect in radiographic image, Milliampere second (mAs) and its effect in radiographic image.

#### **6. Radiographic Techniques**

- 6.1. Introduction to Radiographic Technique- Identity some abbreviation and common medical terms, radiographic positioning terminology.
- 6.2. Skeletal System
- 6.3. Upper Limb - Process of all routine radiographic examination of upper limb including fingers thumb, hand, wrist joint, radio-ulnar joint, lower two third of radius and Ulna.
- 6.4. Shoulder Girdle and Thorax - View of head humerus, shoulder joints; shoulder outlet view, acromio-calvicular joint, view of scapula.
- 6.5. Lower Limb - radiographic examination of the lower limb including foot, toes, great toe, tarsus calcaneum, talo-calaneum.
- 6.6. Vertebral Column - Radiographic examination of the spines cranio- vertebral joint, atlanto-occipital joint.
- 6.7. Pelvic Girdle and HIP Regions - Radiographic examination for whole pelvis, ileum, ischium, and pubic bones.
- 6.8. Skull - Process of routine examination of the bones of skull face, cranium, mandible, zygomatic arches, nasal bone.
- 6.9. Thoracic Cage and Abdomen - Radiographic examination of the thoracic cage including lungs, trachea, bronchi, mediastinal structure, hart and sternum, ribs.

- 6.10. Pelvimetry - Radiation hazard.
- 6.11. Ward and Domiciliary Radiography
- 6.12. Use of Portable/mobile x-ray in ward and operation theatre - Main function and supply of apparatus, procedure in collaboration with theatre staffs.
- 6.13. Mammography - Principle and routine of radiography views of mammography.
- 6.14. Macro-Radiography - Principles and its application.
- 6.15. Tomography - Practical application of tomography of the chest, kidney, gall bladder, skeletal system.
- 6.16. Registration Process - Steps of registration of patient
- 6.17. Dental Radiography

## **7. Hospital Practice & Patient Care**

- 7.1. Communication Skills - Initiate the interaction, identify the reason for examination, and deal with people from different social background.
- 7.2. The Hospital, the patient & the radiographer
- 7.3. Features of General Patient Care - General preliminaries to the examination, moving chair and stretcher with patient.
- 7.4. Sterilization and sterile Techniques - Methods of sterilization.
- 7.5. The Infectious Patient
- 7.6. Nursing Procedures - Laying up a sterile trolley, injection technique, process of oxygen therapy and resuscitation
- 7.7. First aid in X-ray department, shock, hemorrhage, burns, loss of consciousness
- 7.8. General First Aid
- 7.9. Maternal and Child health
- 7.10. Medico-legal aspects of the Radiographers' work

## **8. Basic Health Sciences**

- 8.1. Pharmacology-pharmacokinetics, pharmacodynamics, Iodine, Barrium, Muscle relaxant and sedative hypnotics
- 8.2. Microbiology-Eukyarotypes, prokyrotypes, viruses, bacteria, fungus, parasites
- 8.3. General Pathology-Musculoskeletal system, respiratory system, cardiovascular system, endocrine system, hemopoetic system
- 8.4. Biochemistry-carbohydrate, protein, fat, enzymes, pH, buffer system

## **खण्ड “ख” (Section-B)**

## **9. Radiological Procedures**

- 9.1. First Aid and Emergency Care
- 9.2. Contrast medias -Types, methods of introduction, reactions, emergency equipments and drugs to cope the reaction
- 9.3. Radiographic investigations of gastro-intestinal tract using contrast medias- indications, contraindications and preparation
- 9.4. Investigations of urinary tract and hysteron-salphingography- indications, contraindications and preparation of contrast media and radiographic techniques
- 9.5. Radiographic procedure of biliary tract-OCG, IVC, PTC and PTCD
- 9.6. Vascular and neurological examinations- carotid and vertebral, femoral aortogram, phlebogram, encephlaogram, ventriculogram, myelogram
- 9.7. Special Examinations-Arthrogram, Dacrocystogram, sinogram, Fistulogram, Siologram, Bronchogram, Mammogram, Lymphangiogram, Thermogram, Micro radiography, Soft tissue radiography
- 9.8. Paediatric Radiography-Paediatric radiology

## **10. Radiological and Cross-Sectional Anatomy**

- 10.1. Head and Neck
- 10.2. Thorax
- 10.3. Abdomen and Pelvis
- 10.4. Shoulder, Elbow and Wrist Joints
- 10.5. Hip, Knee and Ankle Joints

## **11. Physics of Modern Medical Imaging Technology**

- 11.1. Dental Imaging
- 11.2. Computed Tomography (CT)
- 11.3. Magnetic Resonance Imaging (MRI)
- 11.4. Ultrasonography
- 11.5. Nuclear Medicine

## **12. Bio-statistics and Research Methodology**

- 12.1. Biostatistics -Scope functions, limitations and usefulness, frequency distribution, central tendency, probability, Correlation and correlation coefficient, regression analysis etc
- 12.2. Basic Epidemiology-Definition, aims, descriptive epidemiology, analytical epidemiology, etc
- 12.3. Research Methodology
- 12.4. Development of project proposal

## **13. Special Imaging Techniques**

- 13.1. Computed Tomography (CT)-over view, application and perform of various kinds of CT in the Human body, helical spiral multislice CT scanning and 3D reconstruction
- 13.2. MRI-over view, application, perform MRI on various parts of the human body

## **14. Quality Assurance in Radio diagnosis**

- 14.1. Quality, light beam, developer, fixer activity, processing chemicals, screen film, grid movement test, collimator test, safe light test, radiation output reproducibility, consistency of radiation output, accuracy of timer test and KVP test, alignment of X-ray beam to X-ray table test, reject film analysis, focal spot size measurement test

## **15. Information Technology**

- 15.1. Basic concept of computer application
- 15.2. Information technology basic
- 15.3. Making digital image
- 15.4. Image capture techniques and dicom (digital imaging and communication in medicine)
- 15.5. Data compression
- 15.6. Local area networks
- 15.7. PACS Picture archiving and communication system
- 15.8. Legal and Financial issues in Tele radiology

## **16. Health Care Management**

- 16.1. Introduction
- 16.2. Personal and Interpersonal Skills
- 16.3. Health and Management Planning
- 16.4. Organizing Function of Management
- 16.5. Human Resource Management
- 16.6. Logistic Management
- 16.7. Health Information Management
- 16.8. Financial Management
- 16.9. Management Research

## 17. Basic X-ray Engineering

- 17.1. Basic items for Electric and Electronic Circuit
- 17.2. The Components and the electronic circuits for X-ray unit
- 17.3. Dark Room electrical and Mechanical Component

### खण्ड “ग” (Section-C)

#### १८. सामान्य ज्ञान तथा नेपाल प्रहरी सेवा सम्बन्धी

- क. नेपालको भूगोल सम्बन्धी सामान्य जानकारी (भौगोलिक अवस्था, स्वरूप, किसिम र विशेषताहरू, हावापानी किसिम र विशेषता, जल सम्पदा: स्थिति र महत्व, वन सम्पदा: अवस्था र महत्व, संरक्षण क्षेत्रहरू तथा वन विनाशका कारण र संरक्षणका उपायहरू, नेपालका प्रमुख हिमशिखरहरू, तालतलैया, झरना, भञ्ज्याङ ।
- ख. इतिहास र संस्कृति सम्बन्धी सामान्य जानकारी (आधुनिक नेपालको इतिहास (पृथ्वीनारायण शाह देखी हालसम्म), नेपालको सांस्कृतिक, धार्मिक एवं मौलिक परम्परा, जातजाति, भाषाभाषी, कला र साहित्य सम्बन्धी सामान्य जानकारी ।
- ग. नेपालको वर्तमान संविधान २०७२ (भाग १, ३, ४, ५, २८ र अनुसूचीहरू)
- घ. जनसंख्या र वातावरण सम्बन्धी सामान्य जानकारी (जनसंख्या, शहरीकरण, बसोवास (बँसाईसराई), जैविक विविधता, जलवायु परिवर्तन, वातावरण तथा प्रदूषण)
- ङ. समसामायिक घटना तथा नविनतम् विषयवस्तुहरू: (राष्ट्रिय तथा अन्तर्राष्ट्रिय महत्वका राजनैतिक, सामाजिक, आर्थिक, वैज्ञानिक, सांस्कृतिक, खेलकूद, पुरस्कार, कला, साहित्य, संगीत सम्बन्धी)
- च. नेपाल प्रहरीको पृष्ठभूमि (वि.स. २००७ साल देखि हालसम्म) र वर्तमान अवस्था ।
- छ. प्रहरी ऐन, २०१२ र प्रहरी नियमावली, २०७१ (संशोधन सहित) का मुख्य-मुख्य व्यवस्थाहरू (संगठनात्मक स्वरूप, सेवाको प्रकार, दर्ज्यानी चिन्ह, पद तथा श्रेणी सेवा, शर्त र सुविधा, प्रहरी आचरण, नियुक्ति र अवकाश, प्रहरी कर्मचारीको काम-कर्तव्य अधिकार, नेपाल प्रहरीमा प्राविधिक प्रहरी कर्मचारीको महत्व र आवश्यकता, नेपाल प्रहरी कार्यालयको स्थापना र कार्यालय प्रमुख सम्बन्धी व्यवस्था)
- ज. विविध:- सुरक्षा समिति (केन्द्र, प्रदेश र जिल्ला), नेपाल प्रहरी र अन्य सुरक्षा निकायहरू (नेपाली सेना, सशस्त्र प्रहरी बल नेपाल र राष्ट्रिय अनुसन्धान विभाग) संगको सम्बन्ध, अपराध परिचय, महत्व र प्रविधिको प्रयोग, विपद व्यवस्थापनमा नेपाल प्रहरी, सार्क, संयुक्त राष्ट्रसंघ, इन्टरपोल सम्बन्धी जानकारी ।

## लिखित परीक्षाको नमूना प्रश्नपत्र

### वस्तुगत बहुवैकल्पिक प्रश्न (Multiple Choice Question)

1. Investigation of choice to diagnose subarachnoid haemorrhage
  - a) MRI angiography
  - b) 4 vessel carotid angiography
  - c) CT scan
  - d) T 2 wave MR
2. The investigation of choice in acute renal failure with complete anuria and normal usg
  - a) renal angiography
  - b) DTPA
  - c) IVP
  - d) retrograde pyelography
3. Typical effective dose with a chest X-ray PA view is
  - a) 0.02 millisievert
  - b) 2 millisievert
  - c) 10 millisievert
  - d) 100 millisievert
4. The maximum field of view which can be obtained with a specific radiographic system is generally limited by the
  - a) focal spot size
  - b) anode size
  - c) anode angle
  - d) focal length
5. Most sensitive test for metastatic deposit is
  - a) isotope scan
  - b) CT scan
  - c) skeletal survey
  - d) tomography

### छोटो प्रश्न (Short Question)

1. What are three main components of MRI explain?

### लामो प्रश्न (Long Question)

1. What is contrast media in radiology? Explain its type, generation and contrast media use in interventional radiology, CT, MRI and USG?

-समाप्त-